REMARKS

The Applicant has now had an opportunity to carefully consider the comments set forth in the Office Action that was mailed November 20, 2009. The withdrawal of the indication of allowability of **claims 6-10** is noted with disappointment. Additionally, all of the rejections are respectfully traversed. Amendment, re-examination and reconsideration are respectfully requested.

The Office Action

In the Office Action that was mailed November 20, 2009:

claims 1, 2 and **4-9** were rejected under 35 USC §112, second paragraph, for allegedly being indefinite;

claims 1, 2, 4, 5 and **9** were rejected under 35 USC §103(a) as being unpatentable over U.S. Patent No. 5,818,539 to Lennen ("Lennen") in view of U.S. Patent Application Publication No. 2002/0172307 A1 by Sandberg ("Sandberg"); and

claims 6-8 were rejected under 35 USC §103(a) as being unpatentable over Lenne, Sandberg and U.S. Patent No. 5,373,298 to Karouby ("Karouby").

The Present Application

By way of brief review, the present application is directed toward methods for validating the detection of a correlation peak detected between a signal transmitted by a plurality of navigation satellites and a local replica generated by a receiver, said replica being of a spread spectrum signal characteristic of a particular satellite. The method includes comparing a determined correlation function with a theoretical autocorrelation function over the whole of the vector of the correlation function. For instance, once a main peak has been detected in a correlation function, a verification is performed that compares the correlation function obtained from the received signal with the theoretical autocorrelation function. The main peak corresponds to the highest peak of the calculated correlation function. In practice, detecting the main peak of the correlation function enables an assumed synchronization time to be determined. The theoretical autocorrelation function is calculated to obtain a main peak centered on the synchronization time. The two functions therefore have a main peak around the

assumed synchronization time. The two functions also have **secondary peaks** or lobes. **By comparing** the secondary peaks, that is to say by verifying, for example, whether they occur at the same time, a deduction is made with regard to whether the detected main peak is in fact associated with the satellite that is being looked for (paragraph 20).

The Cited Documents

In stark contrast, the primary reference of the Office Action to **Lennen does not disclose** comparing a correlation function with a theoretical autocorrelation function as a function of time of spread spectrum signal over the whole of the vector of the correlation function. For example, Lennen **does not disclose or suggest** comparing secondary peaks (e.g., compare the depiction of secondary peaks 5 and 7 in Fig. 1 of the present application to any of Figs 1, 4, 5, 7, 8, 9, 10, or 13 of Lennen). Where the present application is concerned with identifying the satellite associated with the signal, Lennen is concerned with characterizing multipath induced distortions in an autocorrelation function of a correlation receiver in order to reduce effects of these multipath induced distortions on the accuracy of detecting the time of arrival of a signal (Abstract).

While the secondary reference to **Sandberg** mentions the use of autocorrelations, Sandberg does so in the context of a method and apparatus for estimating **Doppler spread**. Accordingly, Sandberg **is not** concerned with validating the detection of a correlation peak and in this sense **is nonanalogous art**. Furthermore, it is respectfully submitted that Sandberg's method of estimating a Doppler spread looks for a position of a **first zero crossing** and/or a first minimum, and contrary to the assertions of the Office Action, **does not disclose or suggest** a comparison of secondary peaks.

Karouby discusses a method of estimating the error in the calculation of the position of a mobile by a GPS receiver and a GPS receiver for implementing this method. Karouby mentions selecting a different constellation of four satellites if the error associated with a selected constellation is above a threshold. It appears that the Office is attempting to draw an analogy between a discussion in Karouby related to the

selection of a new constellation of satellites and the recitation in **claim 6** related to determining the theoretical intercorrelations between the signal of the satellite that is being looked for each of the satellites other than the one that is being looked for, if attempts to validate a correlation peak fail.

However, it is respectfully submitted that the method by which Karouby searches, and the goal of such searches, are clearly different from the subject matter recited in **claim 6** of the present application.

Accordingly, it is respectfully submitted that **claims 1, 2** and **4-9** are not anticipated and are not obvious in light of Lennen, Sandberg and Karouby.

The Claims Are Definite

Claims 1, 2 and **4-9** were rejected under 35 USC §112, second paragraph, as being indefinite because **claims 1** and **2** include the phrase --the vector--, for which the Office Action asserts there is insufficient antecedent basis.

However, while it is respectfully submitted that, as explained at MPEP §2173.05(e), "inherent components of elements recited have antecedent basis in the recitation of the components themselves. For example, the limitation 'the outer surface of said sphere' would not require an antecedence recitation that the sphere has an outer surface", and in the present case, **claims 1** and **9** recite --a correlation function--, it is respectfully submitted that ones of ordinary skill in the art would understand that a vector is associated with the correlation function, and therefore, there is an inherent antecedent basis for the phrase --the vector--. **Nevertheless**, in the interest of compact prosecution, **claims 1** and **9** have both been amended to recite --a vector-- instead of --the vector--.

The Claims Are Not Obvious

Claims 1, 2, 4, 5 and **9** were rejected under 35 USC §103(a) as being unpatentable over Lennen in view of Sandberg.

In this regard, the Office Action stipulates that Lennen **does not disclose** a method of validating the detection of a correlation peak between a signal transmitted by a plurality of navigation satellites and a local replica, the method being characterized in

that it further includes a step of comparing said correlation function with a theoretical autocorrelation function as a function of time of said spread spectrum signal characteristic of said satellite that is being looked for over the whole of the vector of the correlation function wherein comparing said correlation function with the theoretical autocorrelation function includes a step of comparing **secondary peaks** of each of said functions.

In an effort to compensate for this defect, the Office Action relies on paragraphs 45-49 of Sandberg.

However, Sandberg is not concerned with signals transmitted by a plurality of navigation satellites. Accordingly, Sandberg **does not disclose or suggest** any method of validating the detection of a correlation peak between a signal transmitted by a plurality of navigation satellites and a local replica generated by a receiver.

Instead, **Sandberg discusses** a method and apparatus for estimating **Doppler spread** associated with a Rayleigh or fast fading channel established between a radio base station and a mobile radio station. While the method of Sandberg includes the calculation of an autocorrelation function, the autocorrelation function is of a sequence of complex channel estimates (Abstract) and is **not** of a spread spectrum signal characteristic of a satellite. Furthermore, it is respectfully submitted that Sandberg **does not disclose or suggest** comparing a correlation function with a theoretical autocorrelation function over the whole of a vector of the correlation function wherein comparing said correlation function with the theoretical autocorrelation function includes a step of comparing **secondary peaks** of said functions.

In an effort to support the assertion that Sandberg discloses comparing said correlation function with the theoretical autocorrelation function...over the whole of the vector of the correlation function..., the Office Action cites paragraphs 45-49 and Figures 8, 9 and 10 of Sandberg.

However, even though the Figures of Sandberg depict curves that might be said to have first and second peaks, it is respectfully submitted that, as explained in paragraph 41 of Sandberg, the invention of Sandberg determines the autocorrelation function of a received signal using "known sequences", **detects the first zero crossing** of that autocorrelation function, and solves for the Doppler spread **using the**

determined zero crossing lag i_z and two equations. Accordingly, it is respectfully submitted that Sandberg **does not disclose or suggest** comparing a correlation function with a theoretical autocorrelation function over the **whole** of the vector of the correlation function wherein comparing said correlation function with the theoretical autocorrelation function **includes** a step of **comparing secondary peaks** of said functions.

For at least the foregoing reasons, **claim 1**, as well as **claims 2** and **4-8**, which depend therefrom, and **claim 9** are not anticipated and are not obvious in light of Lennen and Sandberg.

Cited paragraph 45 explains how to obtain a complex conjugate. Additionally, paragraph 45 indicates that a complex number output from summer 54 is then passed to a sampler or analog-to-digital converter 56 which samples the complex sequence once every sampling interval. Since some of the symbols are known to the receiver, those known symbols can be multiplied with the samples of the received signal corresponding to the known signal in order to estimate the effect of the channel.

It is respectfully submitted that paragraph 45 **does not disclose or suggest** comparing a correlation function over the whole of the vector of the correlation function wherein comparing said correlation function with the theoretical autocorrelation function includes a step of comparing secondary peaks of said functions.

Cited paragraph 46 discusses Fig. 7 of Sandberg and the depiction of a **Doppler spread estimator** presented there. Allegedly, each of the black dots shown as an input in that Figure corresponds to a sequence of known symbols representing one complex channel estimate. A complex autocorrelator 60 calculates the autocorrelation function in equation 6 of Sandberg.

Cited paragraph 46 also makes reference to Fig. 8, which allegedly illustrates a way of performing the complex correlation of equation 6. The complex autocorrelator 60 uses one channel estimate from every time slot, and in this example, performs a complex correlation with the known signal for a number of different lags.

In **cited paragraphs 46 and 47**, calculations for correlations for two different lags are illustrated.

It is respectfully submitted that cited paragraph 46 **does not disclose or**

suggest comparing the correlation function with a theoretical autocorrlelation function over the whole of the vector of the correlation function wherein comparing said correlation function with the theoretical autocorrelation function includes a step of comparing secondary peaks of each of said functions.

Cited paragraph 48 indicates that the output of the complex correlator is the autocorrelation function C1 illustrated in Fig. 9.

Cited paragraph 49 indicates that the zero crossing detector 62 determines the **first zero** crossing i_z of the autocorrelation function. At this stage, the estimated autocorrelation function should be compared with the theoretical one, i.e., the Bessel function. This can be done by finding the location of the **first zero** on the positive axis and comparing it to the **first zero** in the estimated autocorrelation functions. It is respectfully submitted that paragraph 49 suggests that alternatively, locations of the first minimum in the autocorrelation function could be compared. The search for the **first zero** crossing is performed by identifying the first lag value for which the autocorrelation function is negative. Fig. 9 of Sandberg illustrates particular lag values for the autocorrelation function and indicates the **first zero** crossing at lag i_z. That zero crossing does not correspond to an integer lag value, and therefore, the exact lag value corresponding to the zero crossing may be determined by linear interpolation as shown in Fig. 10.

Accordingly, it is respectfully submitted that cited paragraphs 48 and 49 **do not disclose or suggest** comparing said correlation function with the theoretical autocorrelation function over the whole vector of the correlation function wherein comparing said correlation function with the theoretical autocorrelation function includes a step of **comparing secondary peaks** of each of said functions.

For at least the foregoing additional reasons, **claim 1**, as well as **claims 2** and **4-8**, which depend therefrom, and **claim 9** are not anticipated and are not obvious in light of Lennen and Sandberg.

Additionally, the Office has not met its burden of presenting a *prima facie* case of obviousness. The Office Action asserts that it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the disclosure of Lennen to incorporate the further aspect of selection via correlation function comparison

as a means to further ensure that the most ideal selection is made during the processing of the method steps.

However, Lennen does not suggest any deficiency in the selection made by Lennen or that a more "ideal" selection could be made.

Furthermore, Sandberg is not concerned with navigation satellites. Accordingly, one of ordinary skill in the art would not look to Sandberg even if it included the subject matter alleged by the Office Action (which is disputed). Still further, Sandberg **does not include** the subject matter for which it is relied and the suggested combination would not arrive at the subject matter of **claim 1**. Accordingly, the only motivation for making the suggested combination is information gleaned only from the present application. Accordingly, the rejection of **claim 1**, as well as **claims 2** and **4-8**, which depend therefrom, and **claim 9** are **based on impermissible hindsight reasoning**.

Claim 2 depends from **claim 1** and is not anticipated and is not obvious for at least that reason.

With regard to **claim 4**, the Office Action cites reference numeral 124 from Fig. 11 and column 11, lines 3-17, of Lennen.

However, while element 124 is labeled "scanning correlators", it is respectfully submitted that the inputs to the scanning correlator are the output of an antenna and mixing stage (20, 22) and a local code generator 126. **Accordingly**, it is respectfully submitted that scanning correlator 124 can only determine the correlation between the generated local codes of local code generator 126 and a received signal provided as an in-phase (I) and quadrature (Q) signals (column 10, lines 37-47). Therefore, element 124 and the discussion at column 11, lines 3-17, of **determining a multi-path induced timing errors does not** disclose or suggest **comparing** a correlation function with a theoretical autocorrelation function by calculating **a correlation** between said correlation function and said autocorrelation function, as recited in **claim 4**.

For at least the foregoing additional reasons, **claim 4** is not anticipated and is not obvious in light of Lennen and Sandberg.

Claim 5 depends from **claim 1** and is not anticipated and is not obvious in light of Lennen and Sandberg for at least that reason.

Claims 6-8 were rejected under 35 USC §103(a) as being unpatentable over

Lennen, Sandberg and Karouby.

In an effort to explain the rejection of **claim 6**, the Office Action stipulates that Lennen and Sandberg **do not disclose** the subject matter of **claim 6** and relies on column 3, line 13 - column 4, line 15, of Karouby for disclosure of the subject matter of **claim 6**.

However, the cited portion of Karouby discusses a method of estimating the error in the calculation by a GPS receiver carried by a mobile of the spatial and temporal position of said mobile in a predetermined frame of reference (column 3, lines 13-16) and **does not disclose or suggest** a method of validating the detection of a correlation peak recited in **claim 6**. The cited portion **does not disclose or suggest** or mention determining theoretical intercorrelation functions. **Moreover**, the cited portion of Karouby **does not disclose or suggest** determining theoretical intercorrelation functions as a function of time between a spread spectrum signal characteristic of a satellite that is being looked for and each of the satellites other than said satellite that is being looked for. Still further, the cited portion of Karouby **does not disclose or suggest** comparing said correlation function with each of said theoretical intercorrelation functions as is recited in **claim 6**. In this regard, a more precise citation to portions of Karouby disclosing or suggesting each of these elements is respectfully requested.

For at least the foregoing additional reasons, **claim 6** is not anticipated and is not obvious in light of Lennen, Sandberg and Karouby.

Additionally, the Office has not met its burden of presenting a *prima facie* case of obviousness. For example, the Office Action asserts that it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the degree of error between functions as a means for determining satellite selection as provided in the disclosure of Karouby to ensure that the most ideal selection is made during the processing of the method steps.

However, **claim 6** is not related to utilizing a degree of error. Still further, **claim 6** is not related to determining a satellite selection. **Claim 6** is related to validating the detection of a correlation peak between a signal transmitted by a plurality of navigation satellites and a local replica. Accordingly, combining elements of Karouby with

elements of Lennen and Sandberg for the purpose suggested by the Office Action would not arrive at the subject matter of **claim 6**. Accordingly, the only motivation for making the suggested combination is information gleaned only from the present application, and the rejection of **claim 6** is based on **impermissible hindsight reasoning**.

For at least the foregoing additional reasons, **claim 6**, as well as **claims 7** and **8**, which depend therefrom, is not anticipated and is not obvious in light of Lennen, Sandberg and Karouby.

With regard to **claims 7** and **8**, the Office Action cites the construction of matrix K "and implementation" of column 3 of Karouby.

However, matrix K is constructed from α_{ij} and the α_{ij} <u>are the direction cosines of the angles between the jth coordinate axis and the straight line segment joining said mobile to the ith satellite of said constellation</u>. **Accordingly**, the construction of matrix K has nothing to do with a method for validating the detection of a correlation peak <u>characterized in that each of said spread spectrum signals associated with a particular satellite</u> is selected so that said theoretical autocorrelation function in each of said theoretical intercorrelation functions are different, as is recited in **claim 7**, **or** characterized in that each of said spread spectrum signals associated with a particular satellite is selected so that each of said theoretical intercorrelation functions is decorrelated, as is recited in **claim 8**.

For at least the foregoing additional reasons, **claims 7** and **8** are not anticipated and are not obvious in light of Lennen, Sandberg and Karouby.

<u>Telephone Interview</u>

In the interests of advancing this application to issue the Examiner is invited to telephone the undersigned to discuss the foregoing or any suggestions that the Examiner may have to place the case in condition for allowance.

CONCLUSION

Claims 1, 2 and **4-9** remain in the application remain in the application. **Claims 1** and **9** have been amended to correct antecedence as suggested by the Office Action. The amendments to **claims 1** and **9** do not require a new search.

For at least the foregoing reasons, the application is in condition for allowance. Accordingly, an early indication thereof is respectfully requested.

☒ Remaining Claims, as delineated below:

(1) FOR	(2) CLAIMS REMAINING AFTER AMENDMENT LESS HIGHEST NUMBER PREVIOUSLY PAID FOR		(3) NUMBER EXTRA
TOTAL CLAIMS	**8**	**- 20 =**	**0**
INDEPENDENT CLAIMS	**2**	**- 3 =**	**0**

☒ This is an authorization under 37 CFR 1.136(a)(3) to treat any concurrent or future reply, requiring a petition for extension of time, as incorporating a petition for the appropriate extension of time.

☒ The Commissioner is hereby authorized to charge any filing or prosecution fees which may be required, under 37 CFR 1.16, 1.17, and 1.21 (but not 1.18), or to credit any overpayment, to Deposit Account Number 06-0308.

Respectfully submitted,

Fay Sharpe LLP

February 4, 2010
Date

Joseph D. Dreher, Reg. No. 37,123
Thomas Tillander, Reg. No. 47,334
The Halle Building, 5th Floor
1228 Euclid Avenue
Cleveland, OH 44115
Phone: (216)363-9000
Fax: (216)363-9001

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